CLAIMS

I/We claim:

[c1] 1. An apparatus for handling unmanned aircraft, comprising:

a support structure having a longitudinal axis;

a launch guide structure carried by the support structure, the launch guide structure including an elongated launch path positioned along the longitudinal axis of the support structure to guide an unmanned aircraft during takeoff; and

a flexible recovery line carried by the support structure, the flexible recovery line being suspendable from the support structure to intercept and releasably capture the unmanned aircraft in flight.

[c2] 2. The apparatus of claim 1 wherein the support structure includes a first portion and a second portion, and wherein the at least one of the first and second portions is movable relative to the other between a first position and a second position.

[c3] 3. The apparatus of claim 1 wherein the support structure includes an extendable boom, with a first portion and a second portion of the boom being movable along the longitudinal axis from a retracted position to an extended position.

[c4] 4. The apparatus of claim 1, further comprising a rotatable base, wherein the support structure is pivotally attached to the rotatable base.

[c5] 5. The apparatus of claim 1 wherein the launch guide structure further comprises a launch carriage that is movable along the elongated launch path, the launch carriage being configured to releasably carry the aircraft along the elongated launch path during takeoff.

[c6] 6. The apparatus of claim 1 wherein:

the elongated launch path includes a first rail and a second rail spaced apart from each other and generally parallel to the longitudinal axis of the support structure; and

the launch guide structure further comprises a launch carriage movably carried by the first and second rails, wherein the launch carriage is configured to releasably carry the aircraft along the first and second rails during takeoff.

[c7] 7. The apparatus of claim 1 wherein:

the elongated launch path includes a first rail and a second rail spaced apart from each other and generally parallel to the longitudinal axis of the support structure; and

the launch guide structure further comprises a first launch carriage movably carried by the first rail and a second launch carriage movably carried by the second rail, wherein the first launch carriage is configured to releasably carry a first portion of the aircraft during takeoff, and the second launch carriage is configured to releasably carry a second portion of the aircraft during takeoff.

[c8] 8. The apparatus of claim 1 wherein:

the elongated launch path includes a rail positioned along the longitudinal axis of the support structure; and

the launch guide structure further comprises a launch carriage movably carried by the rail, wherein the launch carriage is configured to releasably carry the aircraft during takeoff.

[c9] 9. The apparatus of claim 1, further comprising the aircraft, and wherein the aircraft includes a lifting surface and a capture device mounted to the lifting surface and configured to releasably secure the aircraft to the recovery line when the aircraft intercepts the recovery line.

[c10] 10. The apparatus of claim 1, further comprising an axially resilient member coupled to the flexible recovery line, the resilient member being positioned to extend when tension is applied to the recovery line.

[c11] 11. An apparatus for handling unmanned aircraft, comprising:

an extendable boom having a first portion and a second portion, with at least one of the first and second portions being movable relative to the other along a longitudinal axis between a retracted position and an extended position;

at least one launch rail positioned generally parallel to the longitudinal axis of the extendable boom to guide an unmanned aircraft during takeoff;

a launch carriage having an aircraft support positioned to releasably carry the aircraft, the launch carriage being movably supported by the at least one launch rail to move along the at least one launch rail during takeoff; and

a flexible recovery line carried by the extendable boom, the flexible recovery line being suspendable from the extendable boom to intercept and releasably capture the unmanned aircraft in flight.

[c12] 12. The apparatus of claim 11 wherein:

the at least one launch rail includes a first launch rail and a second launch rail positioned generally parallel to the longitudinal axis of the extendable boom; and

the launch carriage is movably supported by the first and second launch rails to move the aircraft along the longitudinal axis during takeoff.

[c13] 13. The apparatus of claim 11 wherein:

the at least one launch rail includes a first launch rail and a second launch rail positioned generally parallel to the longitudinal axis of the extendable boom; and

the launch carriage includes a first launch carriage carried by the first launch rail and a second launch carriage carried by the second rail, wherein the first launch carriage is movably supported by the first launch rail to move a first portion of the aircraft along the longitudinal axis during takeoff, and the second launch carriage is movably supported by the second launch rail to move a second portion of the aircraft along the longitudinal axis during takeoff.

[c14] 14. The apparatus of claim 11, further comprising a rotatable base, wherein the extendable boom is pivotally attached to the rotatable base.

[c15] 15. The apparatus of claim 11, further comprising the aircraft, and wherein the aircraft includes a lifting surface and a capture device mounted to the lifting surface and configured to releasably secure the aircraft to the recovery line when the aircraft intercepts the recovery line.

[c16] 16. The apparatus of claim 11, further comprising an axially resilient member coupled to the flexible recovery line, the resilient member being positioned to extend when tension is applied to the recovery line.

[c17] 17. An apparatus for handling unmanned aircraft, comprising:

support means having a longitudinal axis;

launching means carried by the support means, wherein the launching means is positioned along the longitudinal axis of the support means to guide an unmanned aircraft during takeoff; and

recovery means for intercepting and releasably capturing the unmanned aircraft in flight, the recovery means being carried by the support means.

[c18] 18. The apparatus of claim 17 wherein the support means includes an extendable boom having a first portion and a second portion, with at least one of

the first and second portions being movable relative to the other along the longitudinal axis between a retracted position and an extended position.

[c19] 19. The apparatus of claim 17 wherein the recovery means includes a flexible recovery line suspendable from the support means when the support means is in an extended position.

[c20] 20. The apparatus of claim 17 wherein the launching means includes a launch guide structure carried by the support means, the launch guide structure including an elongated launch path positioned along the longitudinal axis of the support means to guide the unmanned aircraft during takeoff.

[c21] 21. The apparatus of claim 17 wherein the launching means includes a launch guide structure carried by the support means, the launch guide structure including an elongated launch path positioned along the longitudinal axis of the support means and a carriage means positioned to guide the unmanned aircraft along the launch path during takeoff.

[c22] 22. A method for handling an unmanned aircraft, comprising:

launching an unmanned aircraft from a support structure;

deploying a flexible recovery line from the support structure;

flying the unmanned aircraft to intercept the flexible recovery line in flight; and

releasably capturing the aircraft in flight with the recovery line.

[c23] 23. The method of claim 22 wherein launching the aircraft includes guiding the aircraft along an elongated launch path of the support structure during takeoff.

[c24] 24. The method of claim 22 wherein launching the aircraft includes releasably carrying the aircraft with a launch carriage, accelerating the launch

carriage along an elongated launch path of the support structure, decelerating the launch carriage, and releasing the aircraft for flight.

[c25] 25. The method of claim 22 wherein the aircraft includes a wing, and wherein capturing the aircraft includes releasably securing the wing to the recovery line.

[c26] 26. The method of claim 22, further comprising applying tension to the flexible recovery line after deploying the recovery line and before releasably capturing the aircraft.

[c27] 27. The method of claim 22, further comprising lengthening an extendable tension member coupled to the flexible recovery line when intercepting the aircraft with the flexible recovery line.

[c28] 28. A method for handling an unmanned aircraft, comprising:

releasably positioning an unmanned aircraft on a launch carriage movably carried on an elongated launch path extending along a longitudinal axis of an extendable boom;

accelerating the launch carriage along the elongated launch path;

decelerating the launch carriage;

releasing the aircraft from the launch carriage for flight;

moving at least a first portion of the boom relative to a second portion of the boom to extend the length of the boom after takeoff;

deploying a flexible recovery line from the boom;

flying the unmanned aircraft to intercept the flexible recovery line in flight;

releasably capturing the aircraft in flight with the recovery line; and

retrieving the aircraft from the flexible recovery line.

[c29] 29. The method of claim 28 wherein the method further comprises moving at least one of the first and second portions of the boom relative to the

other after capturing the aircraft to place the boom in a retracted position before retrieving the aircraft.

[c30] 30. The method of claim 28 wherein the aircraft includes a wing, and wherein capturing the aircraft includes releasably securing the wing to the recovery line.

[c31] 31. The method of claim 28, further comprising applying tension to the flexible recovery line after deploying the recovery line and before releasably capturing the aircraft.

[c32] 32. The method of claim 28, further comprising lengthening an extendable tension member coupled to the flexible recovery line when intercepting the aircraft with the flexible recovery line.